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202401UECM3473OE5a

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Review of preview

Started on	Sunday, 7 April 2024, 12:23 PM
Completed on	Sunday, 7 April 2024, 12:23 PM
Time taken	6 secs
Marks	0/8
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

Past data on two group policyholders are available and are given in the following table. Determine the estimated total credibility premium to be charged to the first group in year 4.

	Policyholder	Year 1	Year 2	Year 3	Year 4
Total Claims	1	-	10050	12200	-
No. in Group		-	90	90	140
Total Claims	2	22550	25550	24100	-
No. in Group		100	110	180	-

_____

Answer:

Make comment or override grade

Incorrect
Correct answer: 21547.4
Marks for this submission: 0/1.

2

Marks: 1

An insurance company has for five years insured three different types of risk. The number of policies in the j^{th} year for the i^{th} type of risk is denoted by m_{ij} for i = 1, 2, 3 and j = 1, 2, 3, 4, 5. The average claim size per policy over all five years for the i^{th} type of risk is denoted by $\bar{X}_i$. The values of m_{ij} and $\bar{X}_i$ are tabulated below.

	Number of policies					Mean claim size
Risk type i	Year 1	Year 2	Year 3	Year 4	Year 5	$\bar{X}_i$
1	17	26	25	28	38	869.0
2	44	51	70	60	43	710.0
3	47	41	72	95	116	925.0

The insurance company will be insuring 30 policies of type 1 next year and has calculated the aggregate expected claims to be 25827.11 using the assumptions of Empirical Bayes method. Calculate the expected annual claims next year for risks 2 assuming the number of policies will be 48. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 35129.976
Marks for this submission: 0/1.

3 Marks: 1

For four group policyholders, the number of exposures in each group for years 1 and 2 are:

	Year 1	Year 2
I	42	61
II	34	53
III	-	18
IV	-	9

Empirical Bayes non-parametric methods are used to assign credibility. You are given:

$$\sum_{i,j} m_{ij}(x_{ij} - \bar{x}_i)^2 = 12{,}000$$

$$\sum_{i} m_i(\bar{x}_i - \bar{x})^2 = 51{,}000$$

Determine the credibility assigned to group 1. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.8118
Marks for this submission: 0/1.

4 Marks: 1

You are making credibility estimates for regional rating factors. You observe that the Bhlmann-Straub nonparametric empirical Bayes method can be applied, with rating factor playing the role of pure premium. X_{ij} denotes the rating factor for region i and year j, where i = 1, 2, 3, and j = 1, 2, 3, 4. Corresponding to each rating factor is the number of reported claims, m_{ij}, measuring exposure. You are given:

i	m_i	$xbar_i$	$vhat_i$
1	75	11.29	1.777
2	115	11.64	1.050
3	135	10.71	1.192

Determine the nonparametric Empirical Bayes credibility premium for group 1, using the method that preserves total losses. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 11.284738
Marks for this submission: 0/1.

5 Marks: 1

Three individual policyholders have the following claim amounts over four years:

Policyholder	Year 1	Year 2	Year 3	Year 4
X	130	150	200	100
Y	230	250	240	100
Z	350	350	280	350

Using the nonparametric empirical Bayes procedure, estimate the pure premium for the coming year for Policyholder Y. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 206.63
Marks for this submission: 0/1.

6 Marks: 1

An insurer has data on losses for 4 policyholders for 8 years. X_{ij} is the loss from the ith policyholder for year j. You are given:

$$\sum_{i=1}^{4} \sum_{j=1}^{8} (X_{ij} - \bar{X}_i)^2 = 36.7; \sum_{i=1}^{4} (\bar{X}_i - \bar{X})^2 = 3.0$$

Calculate the Buhlmann credibility factor for an individual policyholder using nonparametric empirical Bayes estimation. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.836161
Marks for this submission: 0/1.

7 Marks: 1

An actuary has, for three years, recorded the volume of unsolicited advertising that he receives. He has recorded X_{ij} the number of items received in the i^{th} quarter of the j^{th} year (i = 1, 2, 3, 4 and j = 1, 2, 3). The actuary wishes to estimate the number of items that he will receive in the first quarter of year 4. He has recorded the following data:

	X_{i1}	X_{i2}	X_{i3}
i = 1	98	117	122
i = 2	87	108	96
i = 3	76	83	86
i = 4	137	156	148

Use empirical Bayes non-parametric methods to estimate the number of items that the actuary expects to receive in the first quarter of year 4. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 112.255133
Marks for this submission: 0/1.

8 Marks: 1

For a group policyholder, we have the following data available:

	Year 1	Year 2	Year 3
Total Claims	4000	6000	-
No. in Group	10	15	20

If the manual rate per person is 455 per year, estimate the total credibility premium for year 3 using the nonparametric method. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 8000
Marks for this submission: 0/1.

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